



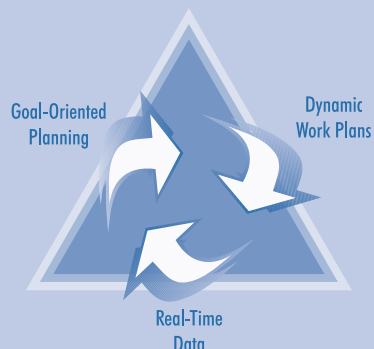
# Environmental Cleanup Program

ISSUE 28 – April 2005

A QUARTERLY NEWSLETTER REPORTING ON CLEANUP AT BEALE AFB

## The Triad Approach

The traditional approach to cleanup is linear. That is, the Air Force writes a work plan or report, the regulatory agencies – California Department of Toxic Substances Control and the Regional Water Quality Control Board – provide comments, and the document is revised and resubmitted until it is approved. This process can consume a great deal of time and delay follow-up rounds of sampling needed to answer questions not answered by the initial round.



The Triad approach compresses the schedule in three distinct ways. First, the regulatory agencies are involved in the initial planning of the field effort. Secondly, the work plan is likely to consist mainly of flow charts that help select strategic sampling locations rather than a specific list of limited sampling locations. Finally, sampling results are provided to the Air Force and agencies as the data are received, so the team can decide the next step of the investigation while crews are still in the field.

## Triad approach helps discover contaminant sources

In summer 2004, crews from three companies investigated three different sites in the Cantonment Area at Beale AFB. Use of the **Triad approach** allowed all three to learn quickly how their investigations were related and to complete in a single field season what otherwise may have taken two or three seasons.

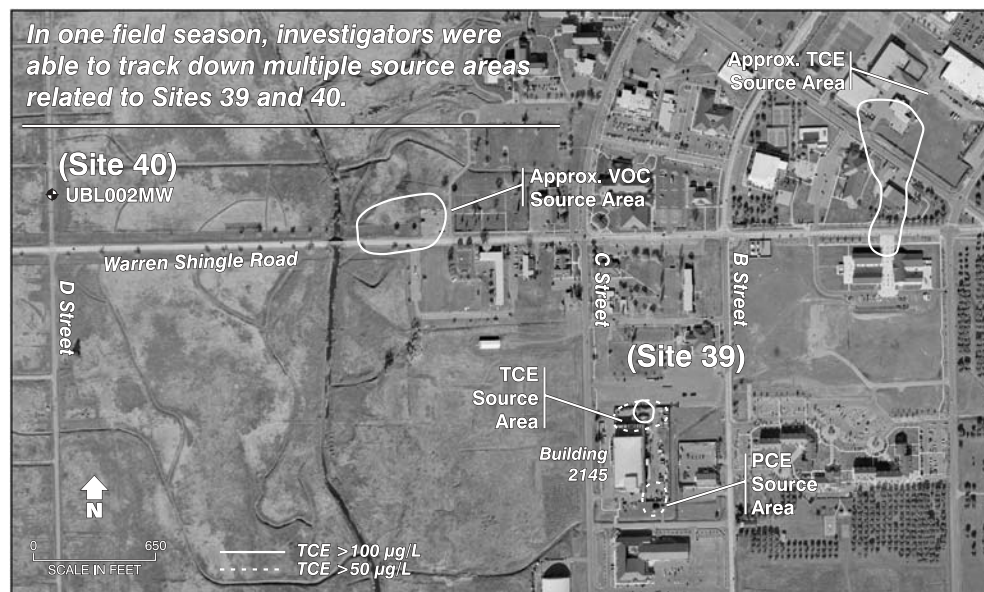
CH2M HILL investigated Site 40, a lone groundwater monitoring well (UBL002MW) in a vacant field. The area was used during World War II for military barracks. Earlier investigations detected the solvent trichloroethene (TCE) in well samples, but the concentration trend over time told investigators the source of contamination was traveling toward the well, not originating in that area. CH2M HILL's mission was to track down the source of TCE.

URS Group, Inc., was investigating the source and extent of soil and groundwater contamination at Site 39, the area near Building 2145. The building is currently used for communication services, but the area previously contained a paint booth and vehicle washrack. URS was also investigating the source of contaminated groundwater migrating toward Site 39.

Versar, Inc., continued its long-term sampling efforts to confirm that former underground storage tank locations are free of contamination.

The Air Force and regulatory agencies held weekly teleconferences to review data. Advances in communications technology make it easier for scientists in the field to get information, such as maps, to stakeholders in a timely fashion.

*Continued on page 2*



## Natural Resources Team replaces wetlands to be disturbed by Site 38 cleanup

The aim of the Environmental Restoration Program is to clean up contamination caused by past practices, some of which may have occurred 50 or more years ago. Cleaning up contaminated soil occasionally requires disturbing protected habitat.

Site 38 is the former location of a skeet range. Areas of soil contain lead (from lead shot) and polycyclic aromatic hydrocarbons (compounds found in clay pigeons, the targets used in skeet shooting). The 30-acre site has less than half an acre of seasonal wetlands (vernal pools) that have the potential to serve as habitat for protected species. Wetlands are seasonally inundated areas with particular types of soil and plants. Vernal pools are seasonal wetlands that are dry nearly 80 percent of the year and have very short-lived species of plants and animals. The pools will be destroyed when contaminated soil is removed from Site 38. The soil will be taken to a licensed disposal facility.

Beale's Lead Biologist, Kirsten Christopherson, ensures the Air Force follows the regulations and

laws for the protection and creation of vernal pools.

When site cleanup or a construction project requires disturbing protected, threatened, and endangered species habitat, laws require two types of responses:

- First, for every acre disturbed, a new acre must be *created*. Beale has three major areas on base designated for just this purpose, where Christopherson and a team of biologists began creating seasonal wetlands and associated grasslands in 2001. "The wetland construction projects have, essentially, already replaced the pools that will be disturbed by the Site 38 cleanup."



**The protected vernal pools at Beale AFB provide scientists opportunities to study the unique habitat, as well as providing some of the soil and seeds used in the creation of new wetlands.**

The constructed wetlands also replaced protected species habitat disturbed when contaminated soil at Site 13 was covered with a cap.

- Secondly, the law requires that the base *preserve* two additional acres of existing seasonal wetlands for every one acre it disturbs. According to Christopherson, science doesn't yet fully understand all facets of vernal pool restoration/creation.

It's estimated that almost 90 percent of the vernal pools in California have disappeared. Sound environmental management has preserved over 330 acres of vernal pools on Beale AFB. ✕

## Triad approach helps discover contaminant sources

*Continued from front page*

Data from these investigations ruled out the former tank locations as contaminant sources for Site 39. The TCE at Site 40 appears to have originated from a previously undiscovered source east of the monitoring well. While the Triad investigation confirmed a source of TCE and tetrachloroethene (PCE) around Building 2145, a new source nearly a half-mile northeast of the building was also discovered

that was not associated with activities related to Building 2145 (see figure on front page).

Mike O'Brien, Chief of Beale's Environmental Restoration Program, said, "had it not been for the Triad approach in the 2004 field investigations, these previously unknown sources may not have been identified this quickly."

Finding a "source" means finding the highest concentrations of contamination. It doesn't necessarily mean that investigators can identify the activity that caused the contam-

ination. Identifying sources is a challenge at Beale AFB because many activities in Beale's early history were temporary, and records are sparse. The depth of the contamination offers clues to investigators about how long ago the contamination of the area occurred and from where it may have originated.

O'Brien said, "We're not finished yet, but we're a lot closer to the finish line than we would be had we not used Triad as an investigative tool at these sites." ✕

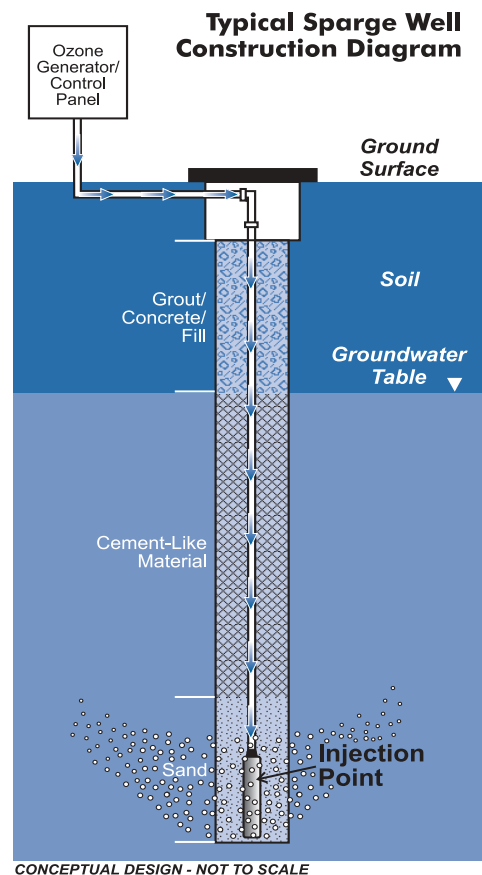
## Ozone/Air Sparging

Ozone/air sparging is one treatment method being considered to clean up groundwater at several sites contaminated with solvents or petroleum hydrocarbons, such as gasoline. Ozone sparging can clean up groundwater in place – without pumping the water to the surface for treatment – making it more efficient and less expensive.

Air sparging is the gentle but forced introduction of air into soil or groundwater. Pumping air into the soil or groundwater causes chemicals like solvents and fuel to evaporate more easily. It also encourages the growth of microbes – tiny bugs found naturally in soil that can use contaminants for food. When microbes digest contaminants, they change it into water

and harmless gases, such as carbon dioxide.

To help clean up sites more rapidly, chemicals called oxidants can be added to the air stream. Common liquid oxidants include hydrogen peroxide and potassium permanganate. Ozone is another type of oxidant. Ozone is a highly reactive gas that is generated on site and injected into the groundwater (see diagram). Ozone quickly begins breaking down contaminants. The number of wells depends on the size of the contaminated area. Ozone/air sparging works best in loose soils, so it's not appropriate for all sites. For some sites, a small-scale study is performed before a full-scale system is built. ✕

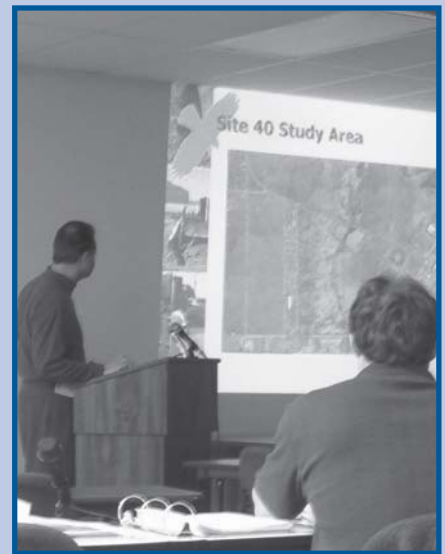


## RAB provides input on 2006 plans

The Restoration Advisory Board (RAB) traditionally reviews funding and proposed project priorities during two meetings each year.

At the March RAB meeting, Mike O'Brien, Chief of Beale's Environmental Restoration Program, presented the projects the Air Force proposes for 2006. The floor was then opened to RAB members and other

attendees for comment. The 15 projects highlighted for 2006 include ongoing operation and monitoring of existing cleanup systems at 12 sites; design or construction of seven new cleanup systems; investigation at three sites; and preparation of a proposed plan and record of decision for one site. The projected budget for 2006 is slightly over \$8 million. ✕



*RAB members reviewed proposed projects and also heard results from recent field investigations.*



*Colonel Long (center) and RAB Community Co-Chair Kyle West (right) discuss the Environmental Restoration Program during a break. Rob Nordahl, Beale's Civil Engineering Squadron Environmental Flight Chief (left), is also a RAB member.*

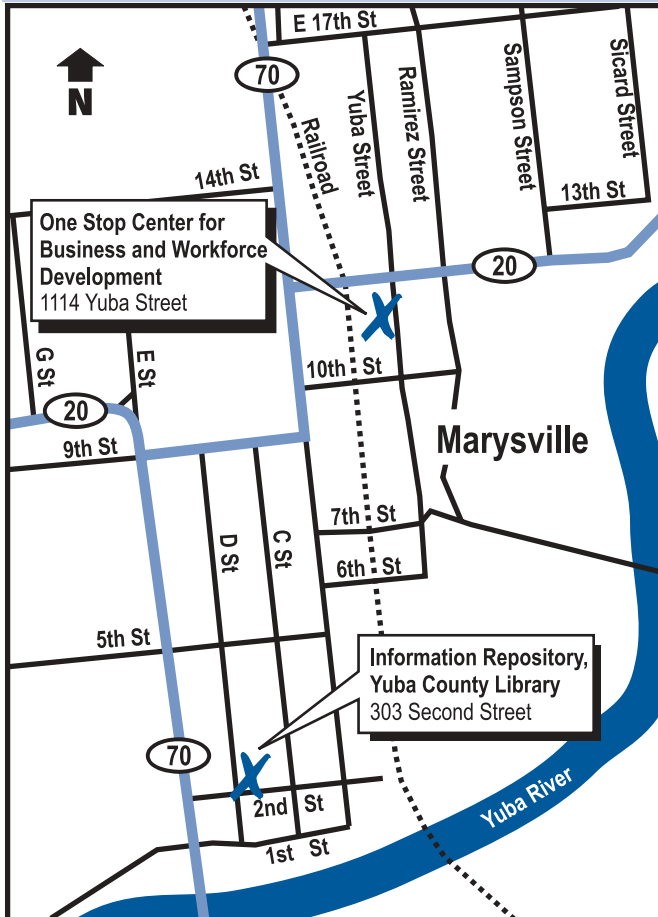


# Upcoming Events

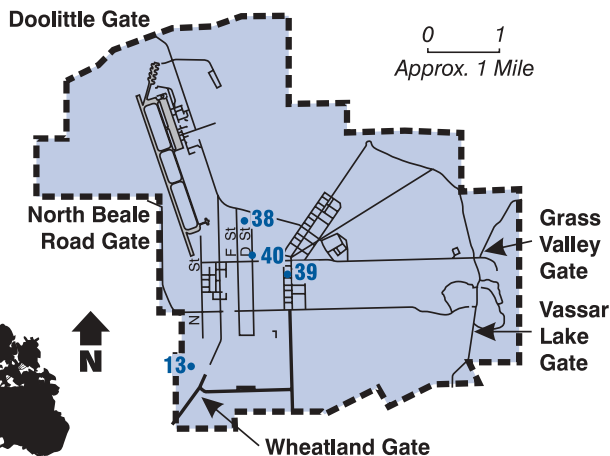
## Restoration Advisory Board Meeting/Open to Public

Thursday, May 19, 2005, 6-8 p.m.

The meeting will be held at One Stop Center for Business and Workforce Development, 1114 Yuba Street, Marysville

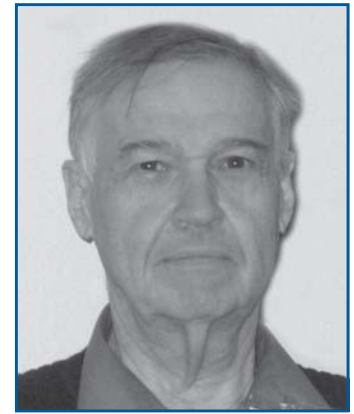


## Sites Discussed in This Newsletter



## Meet the RAB

Phil Farrell



Phil Farrell is a Remedial Project Manager for Beale's Environmental Restoration Program.

During his career, Farrell has witnessed the growth of the environmental engineering industry from many perspectives. His first job as a civil engineer for the U.S. Navy was followed by more than 9 years of process development for petrochemical wastewater and 15 years developing water purification systems for steam electric-generating plants, chemical companies, and other industries. Farrell owned his own company for a time. Most industries have converted to gas turbines instead of steam, reducing the need for the sophisticated water purification systems.

Farrell became a consultant to the Department of Defense and other clients, including AFCEE at Cape Canaveral, usually designing or expanding wastewater treatment systems. Farrell also worked for the Local Redevelopment Authority at the former Kelly AFB, San Antonio, Texas, conducting environmental baseline surveys to aid the transfer and reuse of property.

To look only at Farrell's career, however, is to miss much of the man. His insights and philosophies are unique and personal. When asked about favorite memories of growing up in New York City, Farrell said the diversity and competition of the city created opportunity that inspired people. "The poorest person could ride the subway to any school in New York. Everyone had access to art, symphonies, and the best libraries; money didn't have to limit you. I've never seen another city that offers such opportunity."

Farrell has lived in many cities throughout the United States. He's been at Beale AFB for 6 months. He and his wife still maintain a home in San Antonio, Texas. The couple raised three sons. Farrell won't specify particular plans for the future other than this: His motivation, his passion, is to clean up groundwater and he will continue to contribute to that cause in one way or another.

**The Restoration Advisory Board is a forum through which our local communities, the Air Force, and the regulatory agencies work together in an atmosphere that encourages discussion and exchange of information on the environmental cleanup of Beale Air Force Base. The public is encouraged to attend and participate in Restoration Advisory Board meetings.**